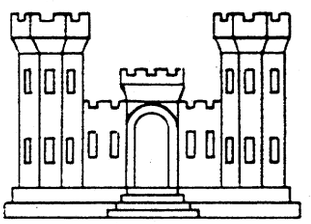
NOT FOR PUBLIC RELEASE

SURVEY REPORT

OF

CATHANCE RIVER

MAINE



AUTHORITY - THIS REPORT IS SUBMITTED IN COMPLIANCE WITH SECTION 6 OF THE RIVER AND HARBOR ACT, APPROVED 2 MARCH, 1945.

U. S. ENGINEER OFFICE
BOSTON, MASS.
31, JULY 1946

COPY NO. 6

SUBJECT: Survey of Cathance River, Maine

NEDGW 1st Ind. CAT/mms
(31 Jul 46)

Division Engineer, New England Division, Boston 10, Mass., 17 September 1946

TO: The Chief of Engineers, U. S. Army, Washington 25, D. C.
ATTENTION: ENGWR

I concur in the recommendation of the District Engineer that no project for improvement of the Cathance River, Maine, be adopted at this time.

D. L. WEART
Brigadier General, U.S.A.
Division Engineer

1 Incl.: n/c

SURVEY OF CATHANCE RIVER, MAINE

Syllabus

The district engineer is of the opinion that the dredging of the Cathance River and the channel across Merrymeeting Bay, to a depth of 14 feet at mean low water, over a width of 100 feet and with additional widening at the turns, is justified, provided local interests contribute one-half the cost of the improvement and furnish suitable areas for the disposal of dredged material. Since local interests are unable to contribute any funds, the district engineer recommends that no project for the improvement of the Cathance River, Maine be adopted by the United States at this time.

War Department,
United States Engineer Office,
Boston 16, Massachusetts,
31 July 1946.

Subject: Survey of Cathance River, Maine.

To: The Chief of Engineers, U. S. Army, Washington, D. C., through the Division Engineer, New England Division, Boston 10, Mass.

1. Authority.- This report is submitted in compliance with Section 6 of the River and Harbor Act approved 2 March 1945 (Public Law No. 14 - 79th Congress) which reads in part as follows:

> "Sec. 6. The Secretary of War is hereby authorized and directed to cause preliminary examinations and surveys to be made at the following-named localities, ... Cathance River, Maine".

2. In accordance with the above authority, a preliminary examination of the locality was made and the district engineer, in his report dated 14 December 1945, recommended that a survey be made. The division engineer and the Board of Engineers for Rivers and Harbors concurred in the views of the district engineer, and a hydrographic survey with necessary probings was authorized by the Chief of Engineers under date of 26 February 1946.

3. Description.- The Cathance River flows in a generally southeasterly direction through the townships of Bowdoin, Topsham and Bowdoinham, and empties into Merrymeeting Bay at its northwestern part. Muddy River empties into this bay from the west, Androscoggin River from the southwest, Abegadasset River from the north, and Kennebec River from the northeast, all having an outlet into the Kennebec River through the Chops, about 18 miles above its mouth.

4. The bridge at Bowdoinham is at the head of navigation of the Cathance River, from which to its outlet into Merrymeeting Bay (a distance of about 2-5/8 miles) the river has a navigable channel with sufficient depths to meet the needs of the traffic using it. From its outlet, the channel continues in an indirect course, with depths varying from 20 to 10 feet for a distance of about 2-1/8 miles, to its junction with the main channel of the Kennebec River near the Chops.

5. Owing to the various rivers which enter Merrymeeting Bay as stated above, and to the resulting currents and cross-currents, varied more or less by tides and freshets and their effects upon the sandy bottom of the bay, changes have necessarily taken place from time to time in the location and depth of the channels of those rivers, and particularly at the bar at the junction of the Androscoggin, Cathance and Abegadasset Rivers with the Kennebec.

6. The mean range of tide is 5.5 feet. There are no bridges over the locality covered in this report nor are questions of water power, flood control, shore line changes, or other special subjects involved. The locality is shown on U. S. Coast and Geodetic Survey Charts Nos. 314 and 1204, and on the map accompanying this report.

7. Tributary area.- Bowdoinham, the only town on the Cathance River, had a population of 915 in 1940, with estates valued at $474,225. The locality immediately adjacent to the tidal section of the river is

undeveloped commercially. The area is sparsely settled and consists mostly of scattered farms. The only industry using the waterway at present is the Sagadahoc Fertilizer Co., Inc. at Bowdoinham which is engaged in the manufacture and sale of fertilizer. Lisbon Falls, 8 miles west of Bowdoinham, uses a considerable amount of Canadian pulpwood, which is now shipped by water to Bath, thence by truck to Lisbon Falls, a distance of about 20 miles. Bowdoinham is located on the Maine Central Railroad and is connected with the surrounding cities and towns by a series of improved roads.

8. Prior reports.- There have been two reports on Cathance River. The first was written in 1879 and recommended the existing project, and the second was the favorable preliminary examination report referred to in paragraph 2.

9. Existing project.- The existing project for Cathance River was adopted in 1879 and provides for a channel of navigable width and not less than 10 feet deep from the outlet of the river into Merrymeeting Bay to the channel of the Kennebec River near the Chops, a distance of about 2-1/8 miles. It was completed in 1883 at a cost of $21,000, since which time no work has been done. In 1926 this office recommended that the project be abandoned because the channel was not being "used by any vessels larger than river scows". The abandonment was recommended in House Document No. 467, 69th Congress, 1st session, and the project is considered "virtually abandoned".

10. Terminal and transfer facilities.- The only wharf at Bowdoinham is owned by the Sagadahoc Fertilizer Co., Inc. It is a cribbed structure capable of accommodating vessels up to 250 feet in length and drawing 16 feet. The only facility on the dock consists of a bin for the temporary storage of fertilizer materials before they are trucked a short distance to the plant.

11. Improvement desired.- A hearing was held at the office of the Sagadahoc Fertilizer Co., Inc., Bowdoinham, Maine, on 9 August 1945 in order to ascertain the improvement desired and to afford interested parties an opportunity to give their views. There were present at the hearing representatives of the Sagadahoc Fertilizer Co., Inc., the Kennebec Towage Co., the Fish and Wildlife Service, Department of the Interior, and citizens of the towns of Bowdoinham, Brunswick and Dresden. The report on the preliminary examination, together with transcript of hearing, exhibits presented, map and other pertinant papers, was submitted to the division engineer 14 December 1945.

12. The improvement desired is the dredging of the Cathance River and the channel across Merrymeeting Bay to a depth of 14 feet at mean low water over a width of 100 feet and with additional widening at the turns. The chief proponent of the project is the Sagadahoc Fertilizer Co., Inc. whose interest in the project is to secure a channel permitting the use of barges drawing up to 17 feet.

13. At the present time the condition of the existing channel across Merrymeeting Bay is such as to limit the barges to a 12-foot draft. It was brought out at the hearing that a channel 14 feet deep at mean low water, with a width of 100 feet except at the turns, would enable the company to receive shipments of chemicals in barges drawing up to 17 feet and with substantially greater capacity.

14. There was no evidence presented at the hearing that any cash contribution toward the cost of the improvement could be expected from any local interest.

15. Commerce and vessel traffic.- The only commerce on the waterway is the fertilizer materials received by the Sagadahoc Fertilizer Co., Inc. in Bowdoinham. The following table shows the tonnages received during the past five years, and the vessels used in their transportation:

Year	Tons	Trips Barges	Draft feet	Trips Tugs	Draft feet
1940	9,296	7	12.5	7	8-10
1941	7,800	6	13	6	8-10
1942	8,000	6	13	6	8-10
1943	3,651	3	12	3	8-10
1944	-0-	0		0	
1945	-0-	0		0	

16. Difficulties attending navigation.- The principal difficulty attending navigation is believed to arise from inadequate channel markings. The survey described in paragraph 17 shows that a navigable channel is available provided it is properly buoyed. According to local interests another difficulty arises from the alleged formation of sand bars across the existing channel in Merrymeeting Bay, although this contention is not borne out by the recent survey. Near Centers Point there is a formation of rocks known locally as the Pumple Stones which encroaches on the channel to some extent, although a navigable channel is available on the north side. In the Cathance River at Goddards Point, a bar has formed which makes it necessary to make a right angle turn in navigating the stream. Ice forms in the Cathance River and in Merrymeeting Bay in the latter part of November, rendering navigation impossible until the first week in April.

17. Survey.- In order to determine the present conditions and to obtain data on which to base an estimate of cost of the desired improvement, a sounding and probing survey was made in April and May, 1946 of the Cathance River and the channel across Merrymeeting Bay. The materials encountered consisted, pricipally, of sand, mud, clay and gravel. The accompanying maps, marked "Cathance River, Maine, in one sheet, scale 1:5000, file No. 1090 D-6-4", shows the latest soundings and probings and other general features.

18. Plan of improvement.- The plan of improvement considered in this report, and shown on the accompanying map, is the same as that desired by local interests and consists of a channel 14 feet deep at

mean low water with a width of 100 feet, except at the turns. This plan is believed to be the minimum to provide a channel adequate for meeting the requirements of local interests, namely a channel capable of accommodating barges drawing about 17 feet.

19. The alignment of the 14-foot channel would follow that of the present 10-foot channel. In the Cathance River at Goddards Point, the existing channel has a turn having a radius of about 500 feet. If the channel across Merrymeeting Bay were deepened to 14 feet, it would be desirable to improve the alignment at Goddards Point by dredging on the inside of the curve. This work has been included in the estimate of quantities shown in paragraph 21.

20. Aids to navigation.- The local representative of the Coast Guard at Boston, Massachusetts has been consulted with respect to the aids to navigation required for the proposed improvement. The locations for the aids recommended by him are shown on the accompanying plans.

21. Estimate of first cost.- The estimate of first cost of the improvement is as follows:

Dredging 236,000 cu. yds., place measurement, @ 60¢ per cu. yd.	$141,600
Estimated cost of providing aids to navigation by U. S. Coast Guard	2,500
Estimated annual maintenance cost	3,500

The above estimate includes engineering and contingency costs and provides for an overdepth allowance of 2 feet. The estimate of cost is based upon the assumption that work will be done with a hydraulic dredge with disposal of the material on adjacent marshy areas. The estimated cost of aids to navigation is based upon costs furnished by the local representative of the U. S. Coast Guard. The estimated annual maintenance cost is based on the assumption that dredging of 118,000 cubic yards will be required every 20 years at a cost of $70,000.

22. Estimate of annual charges.- The estimated annual carrying charge, based on an assumed life of 40 years for the improvement, is given below. Amortization of the cost of the aids to navigation is based on an economic life of 15 years for these structures.

a. Federal Investment:

(1) Estimated cost of new work Engineer Department	$141,600	
Less Local Cooperation, (one-half first cost)	70,800	$70,800
(2) Estimated cost of Aids to Navigation, U. S. Coast Guard		2,500
(3) Total Federal Investment		$73,300

b. Federal Annual Charges:

(1) Interest at 3% on Item a(3)	$ 2,199
(2) Amortization of Item a(1) (40 years at 3%)	939
(3) Amortization of Item a(2) (15 years at 3%)	134
(4) Estimated annual maintenance cost of channel	3,500
(5) Estimated annual maintenance cost of aids to navigation	300
(6) Total Federal Annual Charges	$ 7,072

c. Non-Federal Investment:

(1) Funds to be contributed	$70,800
(2) Total Non-Federal Investment	$70,800

d. Non-Federal Annual Charges:

(1) Interest at 3½% on Item c(2)	$ 2,478
(2) Amortization of Item c(2) (40 years at 3½%)	838
(3) Total Non-Federal Annual Charges	$ 3,316

e. Total Annual Charges:

(1) Federal Annual Charge, Item b(6)	$ 7,072
(2) Non-Federal Annual Charge, Item d(3)	3,316
(3) Total Estimated Annual Charge	$10,388

23. Estimate of benefits.- The benefits of the improvement are those arising from savings in the cost of transportation by reason of being able to utilize fully loaded barges instead of partially loaded ones as in the past, or instead of railroad transportation as at present. With channel depths existing in the past, about 10 feet at mean low water, it was found possible to bring in partially loaded barges carrying about 1,200 tons and drawing about 12 feet. The type of barge used was of about 1,700-ton capacity if fully loaded. The present water rate from Baltimore to Portland, Bowdoinham, or Searsport is $4.35 per net ton for a 1,000-ton minimum load, in the barges customarily used by the company. For loads in excess of 1,000 tons, a reduction in the rate per ton of $0.25 per net 100 tons is available up to 1,700 tons. Hence the saving per ton by using a fully loaded 1,700-ton barge over the same barge loaded only to 1,200 tons would be $1.25 (500/100 x $0.25).

24. Before the war made it practically impossible to secure barges there were received at Bowdoinham 9,296 tons of superphosphate in 1940 and 7,800 tons in 1941. In 1941 one barge of 1,800 tons had to be discharged at Bath because of the lack of sufficient depth in the Cathance River. The total waterborne shipments for 1941 would be 9,600 tons. The Sagadahoc Fertilizer Co., Inc. has stated that if barges are available that about 12,000 tons would be received by water. Based upon increased demand for fertilizer products the estimated volume of 12,000 tons does not appear to be excessive. This would amount to an annual saving to the company, if fully loaded barges are used, of 11,900 tons (7 x 1,700) at $1.25, or $14,875.

25. Although the company is using rail transportation at higher rates for securing fertilizer materials at present, computation of the benefits based upon the difference between the freight rate and the water rate for a 1,700-ton barge is not believed justified in view of the existence of a channel suitable for use of barges drawing about 12 feet and loaded to about 1,200 tons. The improvement will result in no saving on outgoing shipments from the Sagadahoc Fertilizer Co., Inc. since the products of the company are distributed entirely by rail or truck. By far the greatest amount is used by farmers within trucking distance of the plant. It is highly improbable that any shipments would be made by water.

26. Comparison of benefits and costs.- The estimated annual benefits of $14,875 and the estimated annual charges of $10,388 give a ratio of benefits to charges of 1.43 to 1.

27. Local cooperation.- The only beneficiary of the improvement would be the Sagadahoc Fertilizer Co., Inc. There is not at present any other industry or company located on the Cathance River, or in the vicinity, that uses the river in transporting materials or products. There has been no evidence presented to show that such use by others will be an actuality within a reasonable time. Consequently, in view of the extremely local nature of the benefits of the improvement, it is considered that local interests should contribute one-half the cost of the improvement and furnish suitable spoil areas for the disposal of dredged material.

28. The Sagadahoc Fertilizer Co., Inc. stated at the time of the hearing that no contribution could be expected from the company. The manager reaffirmed the company's position at a recent conference, stating that their business was not large enough to warrant the contribution of any funds at this time. He believed that suitable spoil areas could be obtained.

29. Allocation of costs.- The initial cost of the project and the cost of operation and maintenance, are allocated between the Engineer Department, the U. S. Coast Guard, and local interests as follows:

	Initial Cost	Maintenance Cost
Engineer Department	$70,800	$ 3,500
U. S. Coast Guard	2,500	300
Local Interests	70,800	-0-

30. Discussion.- The dredging of the channel 10 feet deep across Merrymeeting Bay was completed in 1883 and subsequent to that time no additional dredging has been done. Traffic on the Cathance River gradually fell off until it's use was limited to a few river scows. Consequently, the abandonment of the project was recommended in 1926 and it has been considered "virtually abandoned" since that time. In 1931 a new management for the Sagadahoc Fertilizer Co., Inc. commenced operations at the plant in Bowdoinham and subsequent to that date there has been some barge traffic on the river in connection therewith.

31. Local interests are of the opinion that as a result of the currents of the various rivers flowing into the bay, together with the action of freshets and the tide, that bars form across the channel. It was stated at the hearing held in August, 1945 that as a result of this action, the controlling depth was 8 feet at mean low water. However, at the time of the survey by this office in April and May, 1946, the least depth in the channel was found to be 9.6 feet occurring in only two small areas not of sufficient size to materially obstruct navigation. While it is possible that bars of a shifting nature may form, the results of the survey do not indicate that such formations would be troublesome. Comparison with the only other data now available, the project map for the original dredging in 1883, indicates that the channel has maintained its alignment and depth remarkably well and that, if anything, the present channel is wider in certain sections.

32. The development of a deeper channel to Bowdoinham would present an opportunity for shipment and receipt of materials from the surrounding communities not on a waterway, but no representative of any of those localities has indicated that the waterway would be used for such purposes. The only beneficiary of the improvement would be the Sagadahoc Fertilizer Co., Inc. This company receives barge shipments of chemicals used in the manufacture of fertilizers. Until the war made it impossible to obtain barges, about 8,000 tons of materials were used yearly, requiring 6 trips of partially loaded barges drawing about 12.5 feet. The company states that the difficulties in navigating the waterway have resulted in barge owners furnishing the barges with reluctance and that the total tonnage received does not represent the tonnage that it is desired to receive by water. It was indicated that about 12,000 tons would be received by water if the barges were available.

33. No materials were received by barge in 1945 and none have been so received this year. The manager of the company recently stated that

they had given up the idea of using water transportation under existing conditions. His reasons for this were the difficulties in securing barges and the difficulty in obtaining towage up the river to the plant. He cited an instance, on one of the last trips, of the towboat hitting the bank and sustaining considerable damage. It is the opinion of this office that this damage was caused by inadequate channel markings rather than insufficient depth or width of channel. It has been the practice for local interests to provide their own markings whenever shipments were due.

34. The probings made at the time of the survey indicate that the material is of the type that can be removed with facility by a hydraulic dredge. There are low areas on each side of the channel throughout its length that would be within reasonable pumping distance of the work. The cost of removing the material by a bucket dredge and towing it in scows 18 miles downstream for disposal would be prohibitive.

35. The ratio of benefits to costs, as stated in paragraph 26, indicates that the improvement is economically justified. However, the nature of the benefits are not sufficiently general in character for the Federal Government to be warranted in undertaking the improvement without a substantial contribution being made by local interests, together with the furnishing of suitable spoil areas by them. Local interests state that they are unable to furnish any cash contribution.

36. Conclusion.- Inasmuch as the local interests are unable to make the required cash contribution toward the improvement, the district engineer concludes that the United States would not be warranted in undertaking the project at the present time.

37. Recommendation.- The district engineer recommends that no project for the improvement of the Cathance River, Maine be adopted by the United States at this time.

C. T. HUNT
Colonel, Corps of Engineers
District Engineer

Inclosure:
Map

CORPS OF ENGINEERS, U. S. ARMY

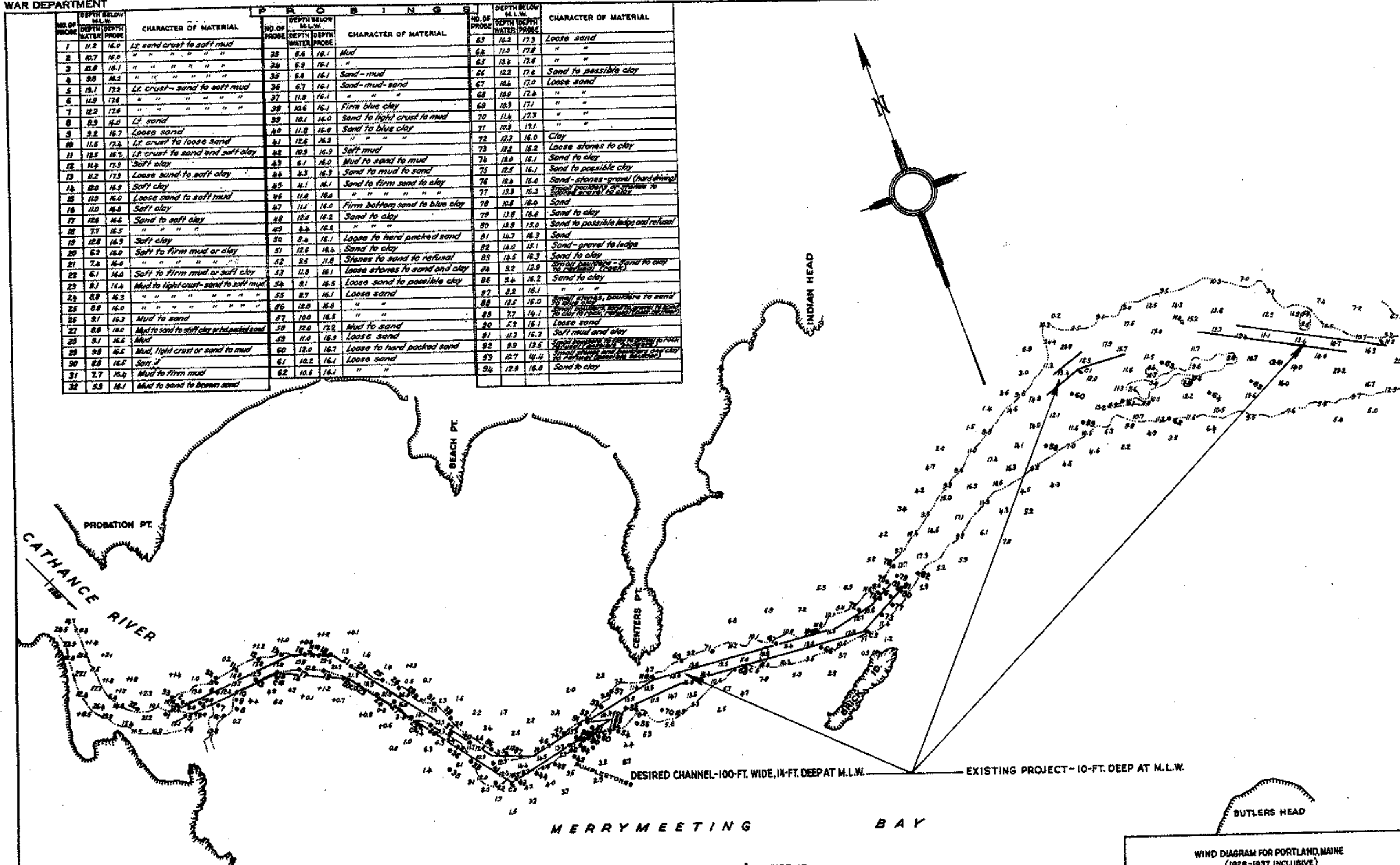
WAR DEPARTMENT

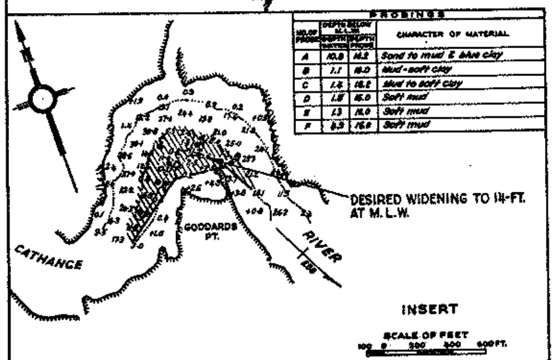
PROBINGS

NO. OF PROBE	DEPTH BELOW M.L.W. DEPTH WATER	DEPTH BELOW M.L.W. DEPTH PROBE	CHARACTER OF MATERIAL
1	11.2	16.0	Lt. sand crust to soft mud
2	10.7	16.0	" " " " " "
3	10.8	16.1	" " " " " "
4	9.8	16.2	" " " " " "
5	13.1	17.2	Lt. crust—sand to soft mud
6	11.9	17.6	" " " " " "
7	12.2	17.6	" " " " " "
8	8.9	16.0	Lt. sand
9	9.2	16.7	Loose sand
10	11.5	17.4	Lt. crust to loose sand
11	12.5	16.7	Lt. crust to sand and soft clay
12	11.4	17.9	Soft clay
13	11.2	17.3	Loose sand to soft clay
14	12.8	16.9	Soft clay
15	11.0	16.0	Loose sand to soft mud
16	11.0	16.8	Soft clay
17	12.6	16.6	Sand to soft clay
18	7.7	16.5	" " " "
19	12.8	16.3	Soft clay
20	6.2	16.0	Soft to firm mud or clay
21	7.4	16.6	" " " " " "
22	6.1	16.0	Soft to firm mud or soft clay
23	8.1	16.4	Mud to light crust—sand to soft mud
24	8.8	16.3	" " " " " " " "
25	8.8	16.0	" " " " " " " "
26	9.1	16.3	Mud to sand
27	8.8	16.0	Mud to sand to stiff clay or hd. packed sand
28	9.1	16.6	Mud
29	9.8	16.5	Mud, light crust or sand to mud
30	8.6	16.5	[illegible]
31	7.7	16.4	Mud to firm mud
32	5.5	16.1	Mud to sand to brown sand

NO. OF PROBE	DEPTH BELOW M.L.W. DEPTH WATER	DEPTH BELOW M.L.W. DEPTH PROBE	CHARACTER OF MATERIAL
33	6.6	16.1	Mud
34	6.9	16.1	"
35	6.8	16.1	Sand—mud
36	6.7	16.1	Sand—mud—sand
37	11.8	16.1	" " "
38	10.6	16.1	Firm blue clay
39	10.1	16.0	Sand to light crust to mud
40	11.8	16.0	Sand to blue clay
41	12.6	16.2	" " " "
42	10.9	16.9	Soft mud
43	6.1	16.0	Mud to sand to mud
44	4.5	16.3	Sand to mud to sand
45	4.1	16.1	Sand to firm sand to clay
46	11.8	16.4	" " " " " "
47	11.5	16.0	Firm bottom sand to blue clay
48	12.6	16.2	Sand to clay
49	4.4	16.9	" " "
50	8.4	16.1	Loose to hard packed sand
51	12.6	16.6	Sand to clay
52	2.5	11.8	Stones to sand to refusal
53	11.8	16.1	Loose stones to sand and clay
54	9.1	16.5	Loose sand to possible clay
55	8.7	16.1	Loose sand
56	12.8	16.6	" "
57	10.0	16.5	" "
58	12.0	17.2	Mud to sand
59	11.6	16.9	Loose sand
60	12.0	16.7	Loose to hard packed sand
61	10.2	16.1	Loose sand
62	10.6	16.1	" "

NO. OF PROBE	DEPTH BELOW M.L.W. DEPTH WATER	DEPTH BELOW M.L.W. DEPTH PROBE	CHARACTER OF MATERIAL
63	10.2	17.3	Loose sand
64	11.0	17.8	" "
65	13.6	17.6	" "
66	12.2	17.6	Sand to possible clay
67	10.6	17.0	Loose sand
68	10.8	17.6	" "
69	10.3	17.1	" "
70	11.4	17.3	" "
71	10.9	17.1	" "
72	12.3	16.0	Clay
73	10.2	16.2	Loose stones to clay
74	10.0	16.1	Sand to clay
75	12.5	16.1	Sand to possible clay
76	12.4	16.0	Sand—stones—gravel (hard driving)
77	13.3	16.3	Small boulders or stones to coarse gravel to clay
78	10.8	16.4	Sand
79	13.8	16.6	Sand to clay
80	13.9	15.0	Sand to possible ledge and refusal
81	14.7	16.3	Sand
82	14.0	15.1	Sand—gravel to ledge
83	14.5	16.3	Sand to clay
84	5.2	12.9	Small boulders—sand to clay to refusal (rock)
85	5.4	16.2	Sand to clay
87	8.2	16.1	" " "
88	12.5	16.0	Small stones, boulders to sand to blue clay
89	7.7	14.1	Small boulders, sand to gravel to [illegible] to clay to rock, refusal [illegible]
90	5.2	16.1	Loose sand
91	11.3	16.3	Soft mud and clay
92	9.9	13.5	Small boulders to clay to gravel to rock refusal [illegible]
93	10.7	14.4	Small stones and boulders and clay to refusal [illegible]
94	12.8	16.0	Sand to clay





PROBINGS

NO. OF PROBE	DEPTH BELOW M.L.W. DEPTH WATER	DEPTH BELOW M.L.W. DEPTH PROBE	CHARACTER OF MATERIAL
A	10.8	16.2	Sand to mud & blue clay
B	1.1	16.0	Mud-soft clay
C	1.4	16.2	Mud to soft clay
D	1.8	16.0	Soft mud
E	1.3	16.0	Soft mud
F	2.3	16.8	Soft mud

LEGEND

HIGH WATER LINE ....

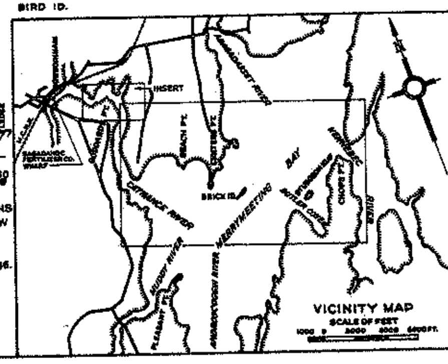
10-FT. CURVE OF DEPTH ....

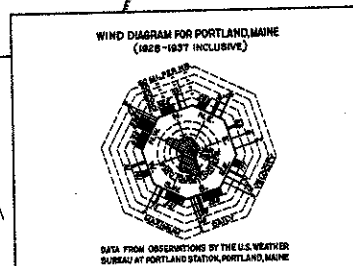
PROBINGS 30

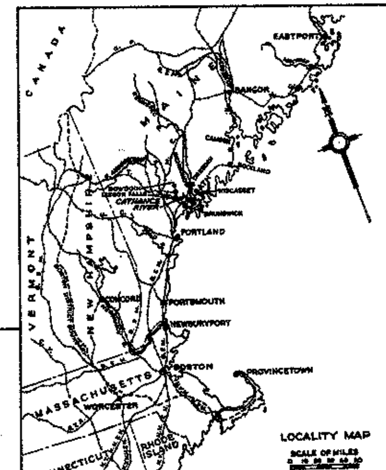
NOTE: SOUNDINGS ARE EXPRESSED IN FEET AND TENTHS AND ARE REFERRED TO THE PLANE OF MEAN LOW WATER.

TOPOGRAPHY, SOUNDINGS AND PROBINGS ARE TAKEN FROM SURVEY MADE IN APRIL, MAY, JUNE, 1946.

PROPOSED AIDS TO NAVIGATION .... N2 & RED NUN, C7 & BLACK CAN







NO.	CHARACTER	DATE	BY

REVISIONS

CATHANCE RIVER
MAINE

IN 1 SHEET — SCALE 1:5000

100 0 200 400 600 800 1000 1200 1400 1600 1800 2000 FT.

U. S. ENGINEER OFFICE, BOSTON, MASS. — 24 JULY 1946

APPROVAL RECOMMENDED: John E. Allen, CHIEF, ENGINEERING DIVISION

APPROVED: [signature], COLONEL, CORPS OF ENGINEERS, DISTRICT ENGINEER

SUBMITTED: H. M. Leighton, ENGINEER, RIVERS & HARBORS BRANCH

TRANSMITTED WITH REPORT DATED 31 JULY 1946.

DWG. BY / DR. BY / TR. BY / CH. BY

FILE NO. 1090 D-6-4

WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY

PROBINGS

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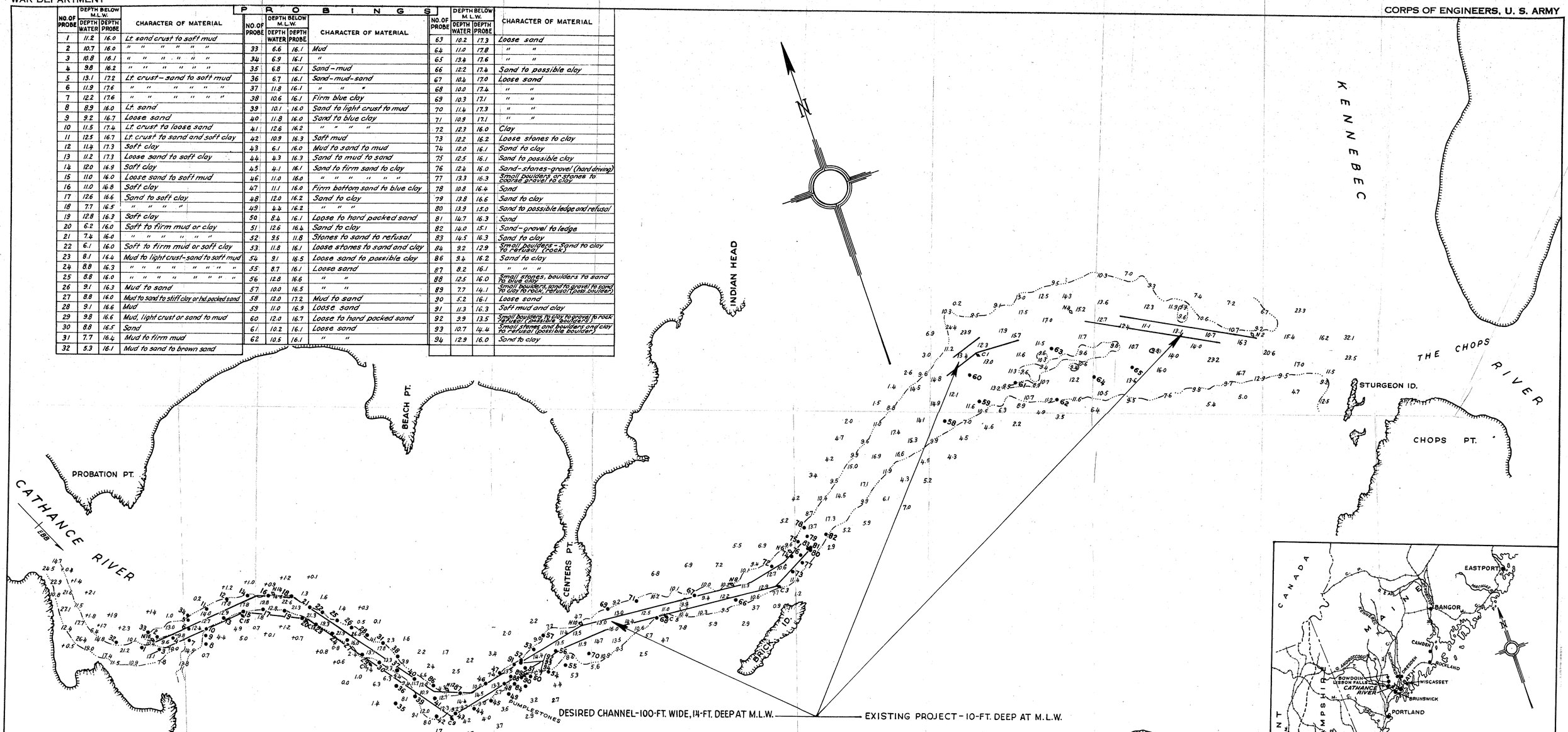
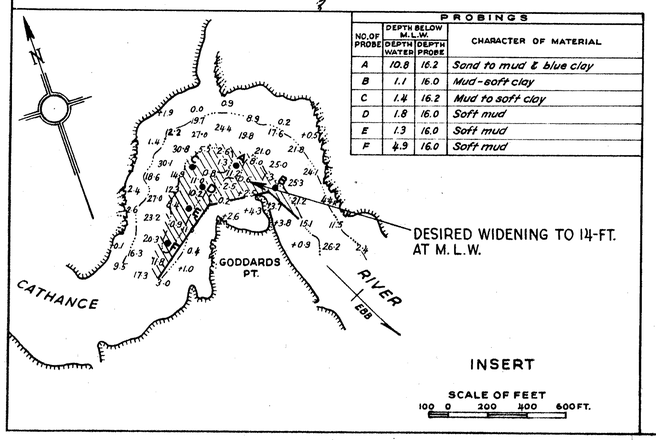
5	13.1	17.2	Lt. crust – sand to soft mud
6	11.9	17.6	" " " " " "
7	12.2	17.6	" " " " " "
8	8.9	16.0	Lt. sand
9	9.2	16.7	Loose sand
10	11.5	17.4	Lt. crust to loose sand
11	12.5	16.7	Lt. crust to sand and soft clay
12	11.4	17.3	Soft clay
13	11.2	17.3	Loose sand to soft clay
14	12.0	16.9	Soft clay
15	11.0	16.0	Loose sand to soft mud
16	11.0	16.8	Soft clay
17	12.6	16.6	Sand to soft clay
18	7.7	16.5	" " " "
19	12.8	16.3	Soft clay
20	6.2	16.0	Soft to firm mud or clay
21	7.4	16.0	" " " " " "
22	6.1	16.0	Soft to firm mud or soft clay
23	8.1	16.4	Mud to light crust-sand to soft mud
24	8.8	16.3	" " " " " " " "
25	8.8	16.0	" " " " " " " "
26	9.1	16.3	Mud to sand
27	8.8	16.0	Mud to sand to stiff clay or txl. packed sand
28	9.1	16.6	Mud
29	9.8	16.6	Mud, light crust or sand to mud
30	8.8	16.5	Sand
31	7.7	16.4	Mud to firm mud
32	5.3	16.1	Mud to sand to brown sand
33	6.6	16.1	Mud
34	6.9	16.1	"
35	6.8	16.1	Sand – mud
36	6.7	16.1	Sand – mud – sand
37	11.8	16.1	" " "
38	10.6	16.1	Firm blue clay
39	10.1	16.0	Sand to light crust to mud
40	11.8	16.0	Sand to blue clay
41	12.6	16.2	" " " "
42	10.9	16.3	Soft mud
43	6.1	16.0	Mud to sand to mud
44	4.3	16.3	Sand to mud to sand
45	4.1	16.1	Sand to firm sand to clay
46	11.0	16.0	" " " " " "
47	11.1	16.0	Firm bottom sand to blue clay
48	12.0	16.2	Sand to clay
49	4.4	16.2	" " "
50	8.4	16.1	Loose to hard packed sand
51	12.6	16.4	Sand to clay
52	9.5	11.8	Stones to sand to refusal
53	11.8	16.1	Loose stones to sand and clay
54	9.1	16.5	Loose sand to possible clay
55	8.7	16.1	Loose sand
56	12.8	16.6	" "
57	10.0	16.5	" "
58	12.0	17.2	Mud to sand
59	11.0	16.9	Loose sand
60	12.0	16.7	Loose to hard packed sand
61	10.2	16.1	Loose sand
62	10.5	16.1	" "
63	10.2	17.3	Loose sand
64	11.0	17.8	" "
65	13.4	17.6	" "
66	12.2	17.4	Sand to possible clay
67	10.4	17.0	Loose sand
68	10.0	17.4	" "
69	10.3	17.1	" "
70	11.4	17.3	" "
71	10.9	17.1	" "
72	12.3	16.0	Clay
73	12.2	16.2	Loose stones to clay
74	12.0	16.1	Sand to clay
75	12.5	16.1	Sand to possible clay
76	12.4	16.0	Sand – stones – gravel (hard driving)
77	13.3	16.3	Small boulders or stones to coarse gravel to clay
78	10.8	16.4	Sand
79	13.8	16.6	Sand to clay
80	13.9	15.0	Sand to possible ledge and refusal
81	14.7	16.3	Sand
82	14.0	15.1	Sand – gravel to ledge
83	14.5	16.3	Sand to clay
84	9.2	12.9	Small boulders – Sand to clay to refusal (rock)
86	9.4	16.2	Sand to clay
87	8.2	16.1	" " "
88	12.5	16.0	Small stones, boulders to sand to blue clay
89	7.7	14.1	Small boulders, sand to gravel to sand to clay to rock, refusal (pass boulder)
90	5.2	16.1	Loose sand
91	11.3	16.3	Soft mud and clay
92	9.9	13.5	Small boulders to clay to gravel to rock refusal (possible boulders)
93	10.7	14.4	Small stones and boulders and clay to refusal (possible boulder)
94	12.9	16.0	Sand to clay





PROBINGS

NO. OF PROBE	DEPTH BELOW M.L.W. DEPTH WATER	DEPTH BELOW M.L.W. DEPTH PROBE	CHARACTER OF MATERIAL
A	10.8	16.2	Sand to mud & blue clay
B	1.1	16.0	Mud-soft clay
C	1.4	16.2	Mud to soft clay
D	1.8	16.0	Soft mud
E	1.3	16.0	Soft mud
F	4.9	16.0	Soft mud

INSERT

SCALE OF FEET
100 0 200 400 600 FT.

LEGEND

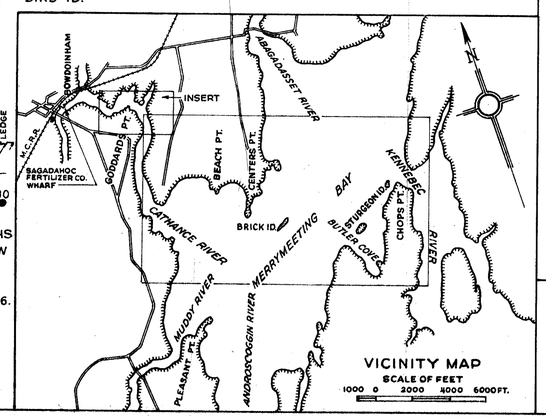
HIGH WATER LINE ..... LEDGE

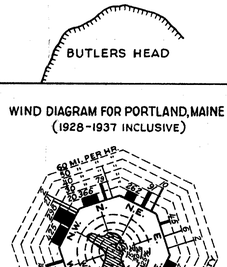
10-FT. CURVE OF DEPTH .....

PROBINGS 30

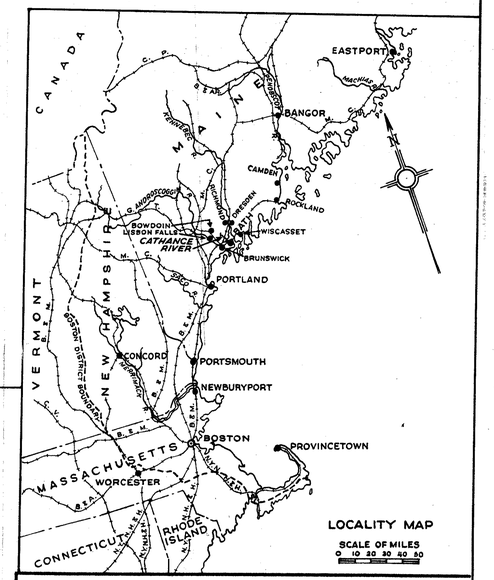
NOTE: SOUNDINGS ARE EXPRESSED IN FEET AND TENTHS AND ARE REFERRED TO THE PLANE OF MEAN LOW WATER.
TOPOGRAPHY, SOUNDINGS AND PROBINGS ARE TAKEN FROM SURVEY MADE IN APRIL, MAY, JUNE, 1946.

PROPOSED AIDS TO NAVIGATION ..... N 2 RED NUN, C 7 BLACK CAN





DATA FROM OBSERVATIONS BY THE U.S. WEATHER BUREAU AT PORTLAND STATION, PORTLAND, MAINE



NO.	CHARACTER	DATE	BY

REVISIONS

CATHANCE RIVER
MAINE

IN 1 SHEET

SCALE 1:5000
100 0 200 400 600 800 1000 1200 1400 1600 1800 2000 FT.

U. S. ENGINEER OFFICE, BOSTON, MASS. 24 JULY 1946

APPROVAL RECOMMENDED
John E. Allen
Chief Engineering Division

APPROVED:
Chief of Corps of Engineers
District Engineer

SUBMITTED:
H. K. Bristow
Sr. Engineer, Rivers & Harbors Branch

TRANSMITTED WITH REPORT DATED 31 JULY 1946.

DES. BY
DR. BY
TR. BY
CH. BY

FILE NO. 1090 D-6-4